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(71) Applicant and
(72) Inventor: **CHANG, Eung-Soon** [KR/KR]; 103-904 Samik Ceramic Apt., 1038 Mansoo-dong, Namdong-gu, Inchon 405-240 (KR).

(74) Agent: **YOO, Dong-Ho**; Kangnam Building, Room 903, 1321-1 Socho-dong, Socho-gu, Seoul 137-070 (KR).

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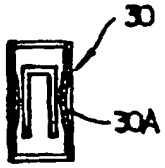
(54) Title: ANTENNA FOR PORTABLE WIRELESS MACHINERY



(57) Abstract: By improving the structures of a spring and a c-ring, which are built inside a helical antenna, and thus enhancing the width of the band of the antenna, despite change in frequency, communication quality is less influenced, and subsequently, impedance is enhanced and the standing-wave ratio becomes closer to the base value. A portable wireless antenna comprises: a helical antenna wherein a metal road is fixed by being inserted and soldered at the one side of a spring, and a bobbin is inserted at the inner side of the spring, and then the metal road, the bobbin and the spring are inserted and injected; a road antenna which consists of a handle, an insulation portion and a wire and which is inserted and fetched in the middle portion of said helical antenna, said spring wherein a wire to have a fixed width by being rolled, is wound and formed, a c-ring is built at the inner side of said metal road, said c-ring wherein a plurality of elastic plates is formed at the side, by press-finishing beryllium bronze to elastically support said fetched and inserted road antenna.

【 Title of the Invention 】

Antenna for portable wireless machinery

【 Brief Description of drawings 】

Figure 1 is a drawing showing a conventional antenna.

Figure 2 is a drawing showing the helical antenna in a conventional antenna.

Figure 3 is a drawing showing + cutting portion and C-ring portion in a conventional antenna.

Figure 4 is a drawing showing the antenna of the present invention.

Figure 5 is a drawing showing the helical antenna of the present invention.

Figure 6 is a drawing showing C-ring used on the antenna of the present invention.

Figure 7 is a flow chart showing the assembly process of the antenna of the present invention.

Figure 8 is a drawing showing the Smith chart of the antenna of the present invention and a conventional antenna.

Figure 9 is a drawing showing the standing-wave ratio of the antenna of the present invention and a conventional antenna.

Figure 10 is a drawing showing the moribund loss of the antenna of the present invention and a conventional antenna.

Figures 11 to 14 are drawings showing the radiation pattern of the antenna of the present invention and a conventional antenna.

Figure 11 is a graph showing the radiation pattern of 824MHz

Figure 12 is a graph showing the radiation pattern of 849MHz

Figure 13 is a graph showing the radiation pattern of 869MHz

Figure 14 is a graph showing the radiation pattern of 894MHz

< Explanation of signals relating to the main portions of drawings >

25A: Spring 30: Ring

30A: Elastic plate

【 Detailed description of the Invention 】

【 Purpose of the Invention 】

【 The field pertaining to the invention and prior art thereof】

The present invention relates an antenna for portable wireless machinery which is attached to portable wireless machinery, and therefore, transmits and receives high frequency signals of fixed frequency, and particularly to an antenna for portable wireless machinery which by improving the structures of a spring and a c-ring built in a helical antenna, thus enhancing the band width of the antenna, despite change in frequency, allows communication quality to be less influenced, and subsequently, allows impedance to be enhanced and standing-wave ratio to become closer to the base value.

As a general, wireless machinery uses antenna to carry out wireless communication. In other words, wireless machinery supplies high frequency signal which is output from the modulation portion, thus transmits it into the air. Also, such machinery received via antenna fixed frequency signals transmitted through the air.

To enhance the features of transmission and reception of these antennas, according to the frequency range of high frequency signals transmitted and received, the impedance of antenna and transmitter-receivers are matched with each other and loss is reduced by preventing unnecessary radiation.

And a antenna used on portable wireless machinery has the following characters:

A helical antenna and a road antenna are integral in such antenna and the helical antenna is operated where the road antenna is inserted and the road antenna is combined with the helical antennas in a parallel manner where the road antenna is extended. Accordingly, the operation of antenna is mostly carried out in the road antenna.

The helical antenna of this antenna has a spring which a fixed wire is wound around it.

Figure 1 is a drawing showing a conventional antenna. In this context, signal 2- is the antenna portion.

Said antenna portion (20) is composed of

a handle (21) enabling a user to hold it by hand, where an antenna is extended and/or inserted;

an insulation portion (22);

a helical antenna (23) having a spring (25) which is operated where it combines with the body of wireless machinery (not illustrated), and which winds around the fixed wire;

Ni-Ti wire (24) which in a case where the antenna is extended, parallel combines with said helical antenna (23), thereby serving as antenna.

Figure 2 is a drawing showing the helical antenna (23) in the antenna of said figure 1. As illustrated, a helical antenna (23) wherein a spring (25) at the inner part and a metal road (26) combined with the spring (25) are equipped, therefore, the lower portion of the spring (25), is wound around the metal road (26) in one (1) Turn, thus being fixed by pucker. The bobbin (27) made of rubber is inserted at the inner part of said spring (25), thereby supporting the spring (25).

Figure 3 is a drawing showing + cutting portion (28) and c-ring (29) used on a conventional helical antenna. On the condition that a c-ring (29) is inserted at the outer side of the + cutting portion (28), it is inserted at and fixed to the lower portion of said metal road (28).

Conventional antennas having the above-mentioned composition, provide the followings:

where a user fetches and inserts a road antenna, namely, an insulation portion (22) and the Ni-Ti wire (24), with a user holding the handle (21), the "+ cutting portion (28) " opens to the outside by the elastic force of +cutting portion and said C ring (29). It is restored to the original state and at the same time, the insulation portion (22) and Ni-Ti wire (24) is held, inserted and fetched.

However, in case of prior arts, long-term use leads the elastic force of + cutting portion (28) and C-ring to be lowered, thus, the inserted and fetched insulation portion (22) and the Ni-Ti wire (24) are not held fixed.

In addition, in case of prior antenna stated above, the reflection loss is high, thus the band width which can be covered by the antenna, is narrow. Accordingly, either where the antenna is touched by a person's hand or where frequency is changed at the time of communication, the communication quality will be influenced. Since the impedance of the antenna does not reach the base value, 50Ω , the transmitter-receiver and impedance are likely to be mismatched. Producing/Outputting standing-wave ratio bigger than the basic value. So, electric power reflection is high and electric power loss at the antenna is great.

【 Technical problem intended to be resolved by the present invention 】

Accordingly, the purpose of the present invention to an antenna for portable machinery which enhances the band width by improving the structures of a spring and c-ring built in a helical antenna, and less influences communication quality even where the movement of frequency occur at the time of communication, and which makes the standing-wave ratio become closer to the base value, together with the enhancement of impedance.

【 The composition and effect of the invention 】

According to an antenna for portable wireless machinery of the present invention for accomplishing the purpose,

An antenna for portable wireless antenna comprises:

a helical antenna wherein a metal road is fixed by being inserted and soldered at one side of a spring, and a bobbin is inserted at the inner side of the spring, and then the metal road, the bobbin and the spring are inserted and injected;

a road antenna which consists of a handle, an insulation portion and a wire and which is inserted in the middle portion of said helical antenna and is fetched,

Said spring

said spring wherein a wire to have a fixed width by being rolled, is wound and formed, a c-ring is built at the inner side of said metal road, said c-ring wherein a plurality of elastic plate (30A) is formed at the side, by press-finishing beryllim bronze to elastically support said fetched and inserted road antenna.

Also, the present invention has the following features:

A portable wireless antenna comprises:

a helical antenna wherein a metal road is fixed by being inserted and

soldered at one side of a spring, and a bobbin is inserted at the inner side of the spring, and then the metal road, the bobbin and the spring are inserted and injected;

a road antenna which consists of a handle, an insulation portion and a wire and which is inserted and fetched in the middle portion of said helical antenna,

said spring wherein a wire to have a fixed width by being rolled, is wound and formed, a c-ring is built at the inner side of said metal road, said c-ring wherein a plurality of elastic plate (30A) is formed at the side, by press-finishing beryllim bronze to elastically support said fetched and inserted road antenna.

Hereinafter, the detailed explanation will be provided, with the drawings of figures 4 to 14 enclosed for preferred embodiment of an antenna for portable wireless machinery of the present invention.

Figure 4 is a drawing showing the antenna of the present invention. As illustrated therein,

an antenna portion (20) of wireless machinery consisting of a handle (21), a insulation portion (22), a helical antenna (23) and Ni-Ti wire (24),

Said spring (25A) is formed by rolling and winding a wire of fixed diameter and a plurality of elastic plate (30A) is formed inside by the press finishing of beryllium bronze by C-ring (30). Amongst drawings, signal 31, which is not explained, is a

stopper and the signal is fixed to the lower portion of said Ni-Ti wire (24), thereby Ni-Ti wire (24) not being detached from the helical antenna (23).

Figure 5 is a drawing showing a helical antenna in the antenna of the present invention. As illustrated, the acrocentric portion of the metal road (26) is inserted at one end of said spring (25A), and subsequently, the portion is fixed by being soldered, and then the bobbin (32) is inserted inside the spring (25A).

Figure 6 is a drawing showing C-ring used on the antenna of the present invention. As illustrated, the C-ring (30) of the present invention is in its entirety formed as a cylindrical body and the four elastic plates (30A) to elastically fix the antenna, at the time when the antenna is detached from and attached to the body, is integrally formed in a press finishing manner.

The effect of the present invention is explained as follows:

The antenna of the present invention is fixed by being inserted and soldered at the assembly portion, to fix the spring (25A) to the metal road (26).

And the spring (25A) allows the outer diameter to roll about ϕ 0.5 wire, thereby to have fixed width, and then to wound it at fixed interval fixed times, for example, about 8.5 times.

Also, heat-treated beryllium bronze is used as C-ring (30) and a plurality of

elastic plate (30A) by press-finishing, is formed inside.

Figure 7 is a flow chart showing the assembly process of the antenna of the present invention. As illustrated, the C-ring (30) which is process-finished like (A), is inserted at a Roguro (33) and puckers like (B).

The spring (25A) is assembled and soldered at the Roguro (33) like (C).

Next, like (D), the spring (25A) inserts the bobbin (32) at the assembled Roguro (33) upwardly and downwardly.

And like (E), the assembled Roguro, is inserted and injected, thereby forming the helical antenna (23).

Thereafter, like (F), the injected helical antenna (23) inserts a nob (22) at the pipe, a stopper (31) is fixed by being inserted at and punching the lower portion of the Ni-Ti wire (24).

Since a C-ring (30) which is inserted at the inner side of the lower portion of the spring (25A), is formed as a cylindrical body having a plurality of the elastic plate (30A) at the inner side of the lateral, where the insulation portion (22) and the Ni-Ti wire (24) are fetched, the insulation portion (22) and the Ni-Ti wire (24) are supported, being under elasticity by said elastic plate (30A), and is fixed. Also, where the insulation portion (22) and the Ni-Ti wire (24) are inserted, they are elastically fixed by

said elastic plate (30A).

Figure 8 is a drawing illustrating the Smith chart of the antenna of the present invention and a conventional antenna, and Figure 9 is a drawing showing the standing-wave ratio and Figure 10 is a drawing showing the reflection loss. In this context, the position (1) and the position (2) of point (∇ and $\triangle$) are the transmit frequency band, 824MHz and 849 MHz. Those of point (3) and the position (4) are the transmit frequency band, 869MHz and 894MHz.

As shown in said Figure 8, the antenna of the present invention is closer to the base value of antenna, 50 Ω than conventional antennas. As shown in Figure 9, in case of the antenna of the present invention, the standing-wave ratios in 824MHz, 849MHz, 869MHz and 894MHz are 1.4446, 1.2319, 1.3118 and 1.7946. That is to say, the standing-wave ratio of the antenna of the present invention is lower than conventional antenna, therefore, the antenna of the present invention has broader band width than conventional antennas. As shown in Figure 10, it has been revealed that the reflection loss of the antenna of the present invention are -12.121dB, -17.09dB, -20.305dB and -12.246dB in 824MHz, 849MHz, 869MHz and 894MHz respectively. It show that the reflection loss of the antenna of the present invention is lower than conventional antennas.

Figures 11 to 14 are drawings showing the radiation pattern of the antenna of the present invention and a conventional antenna and graphs illustrating the radiation pattern at 824MHz, 849MHz, 869MHz and 894MHz respectively.

As shown in Figure11, in case of the radiation values of the antenna of the present invention and conventional antenna, each maximum value in 824, is -32.18dB and -32.85db respectively in the direction of - 65 °. As shown in Figure 12, the maximum in 849MHz is -31.18db respectively in the direction of -50.01 ° and -32.53dB in the direction of -50 °. As shown in Figure 13, the maximum value in 869MHz is -31.95dB in the direction of -49.99 ° and -32.52dB in the direction of -55

As shown in Figure 14, the maximum is -30.44dB in the direction of -50.01 ° and -31.11dB in the direction of -50 °. Eventually, the antenna of the present invention radiated as having higher value.

【 Effect of the invention 】

As described thus far, the present invention has the following effects:

By informing a spring wherein a wire having the fixed width by roll, is wound and which is built in a helical antenna, the band width of the antenna widened, thereby being able to enhance the characteristic of the antenna.

By pressing and finish a C-ring installed at the lower portion inside said spring with beryllium bronze and forming an elastic plate, the cost can be reduced by less than that of existing cutting processing products. And the quality turns out to be better.

【What is claimed is】

【 Claim 1 】

An Antenna for portable wireless machinery comprises:

a helical antenna wherein a metal road is fixed by being inserted and soldered at one side of a spring, and a bobbin is inserted at the inner side of the spring, and then the metal road, the bobbin and the spring are inserted and injected;

a road antenna which consists of a handle, an insulation portion and a wire and which is inserted and fetched in the middle portion of said helical antenna,

said spring wherein a wire to have a fixed width by being rolled, is wound and formed, a c-ring is built at the inner side of said metal road, said c-ring wherein a plurality of elastic plates is formed at the side, by press-finishing beryllium bronze to elastically support said fetched and inserted road antenna.

【 Claim 2 】

An antenna for portable wireless machinery comprises:

a helical antenna wherein a metal road is fixed by being inserted and

soldered at one side of a spring, and a bobbin is inserted at the inner side of the spring, and then the metal road, the bobbin and the spring are inserted and injected;

a road antenna which consists of a handle, an insulation portion and a wire and which is inserted and fetched in the middle portion of said helical antenna,

A C-ring is built inside said metal road,

Said C-ring wherein a plurality of elastic plates is formed at the side, by press-finishing beryllium bronze to elastically support said fetched and inserted road antenna.

FIG. 1

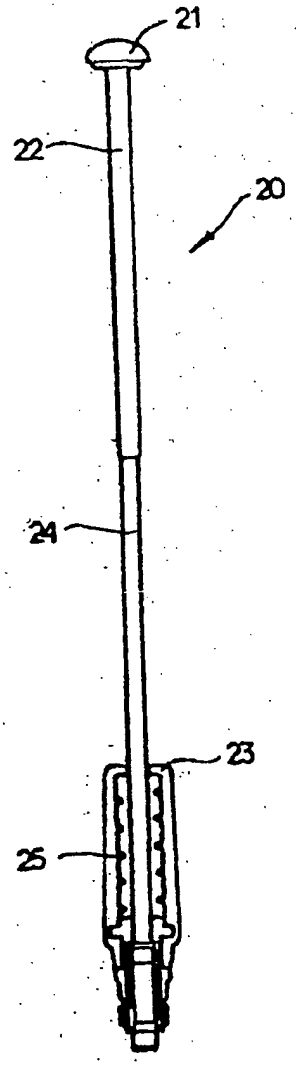


FIG. 2

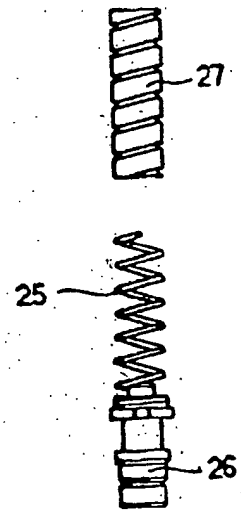


FIG. 3

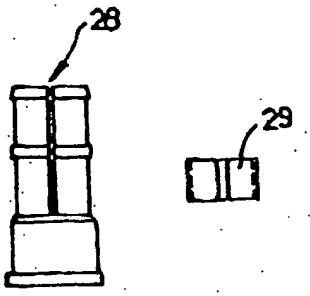


FIG. 4

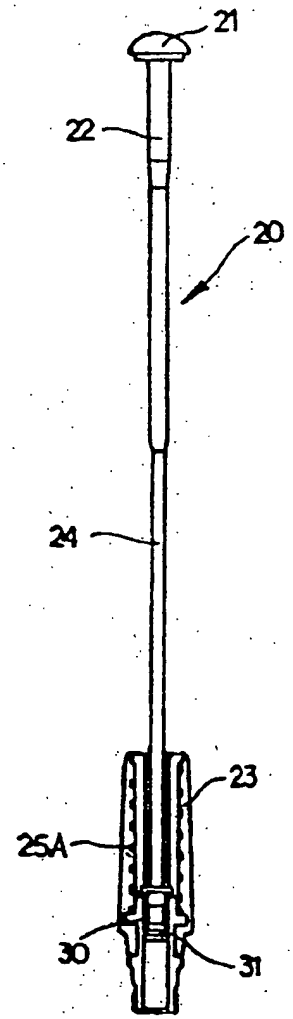


FIG. 5

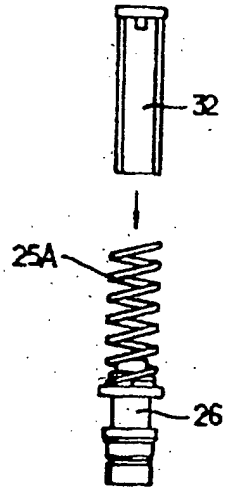


FIG. 6

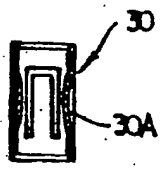


FIG. 7.

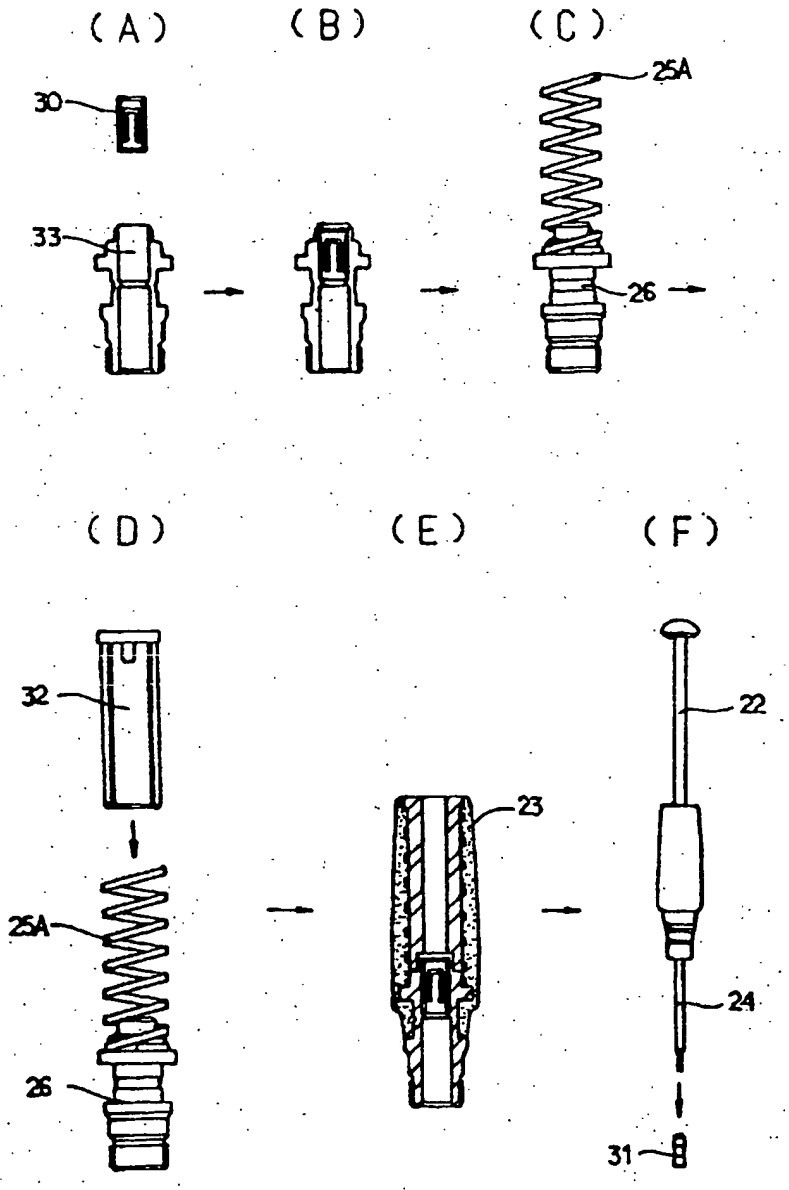
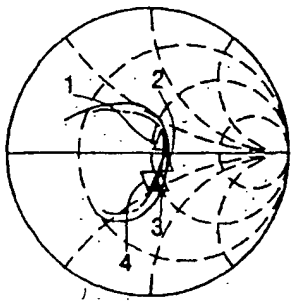


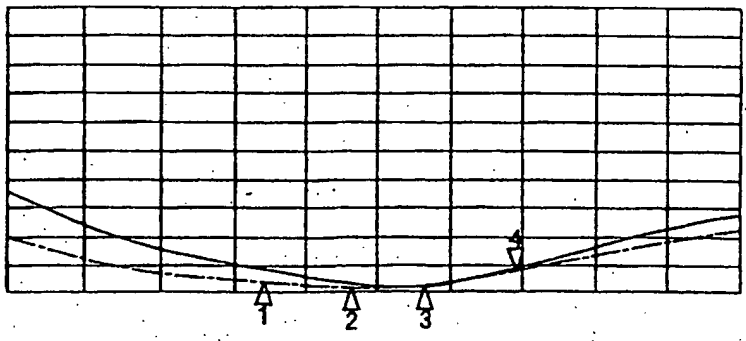
FIG. 8



_____ conventional antenna

- - - - - - the antenna of the present invention

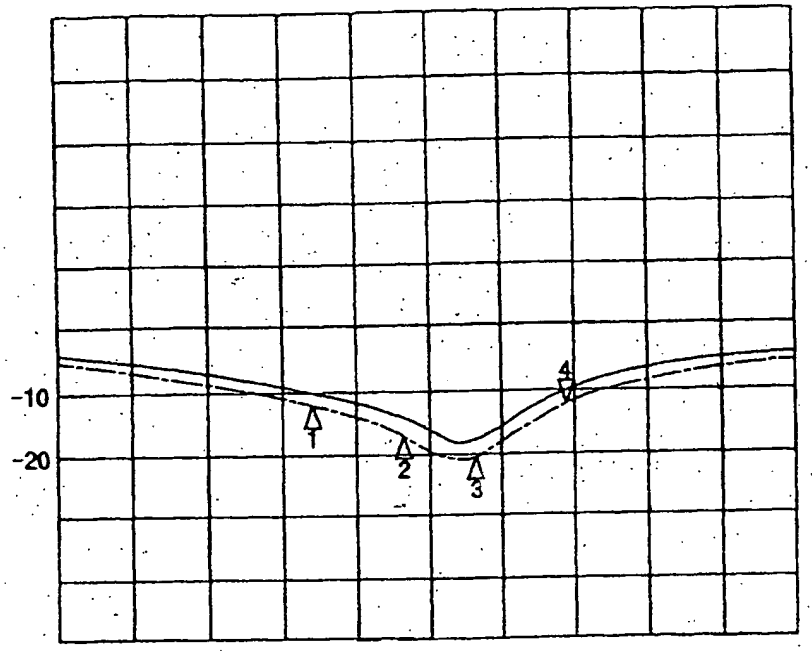
FIG. 9.



_____ conventional antenna

- - - - - - the antenna of the present invention

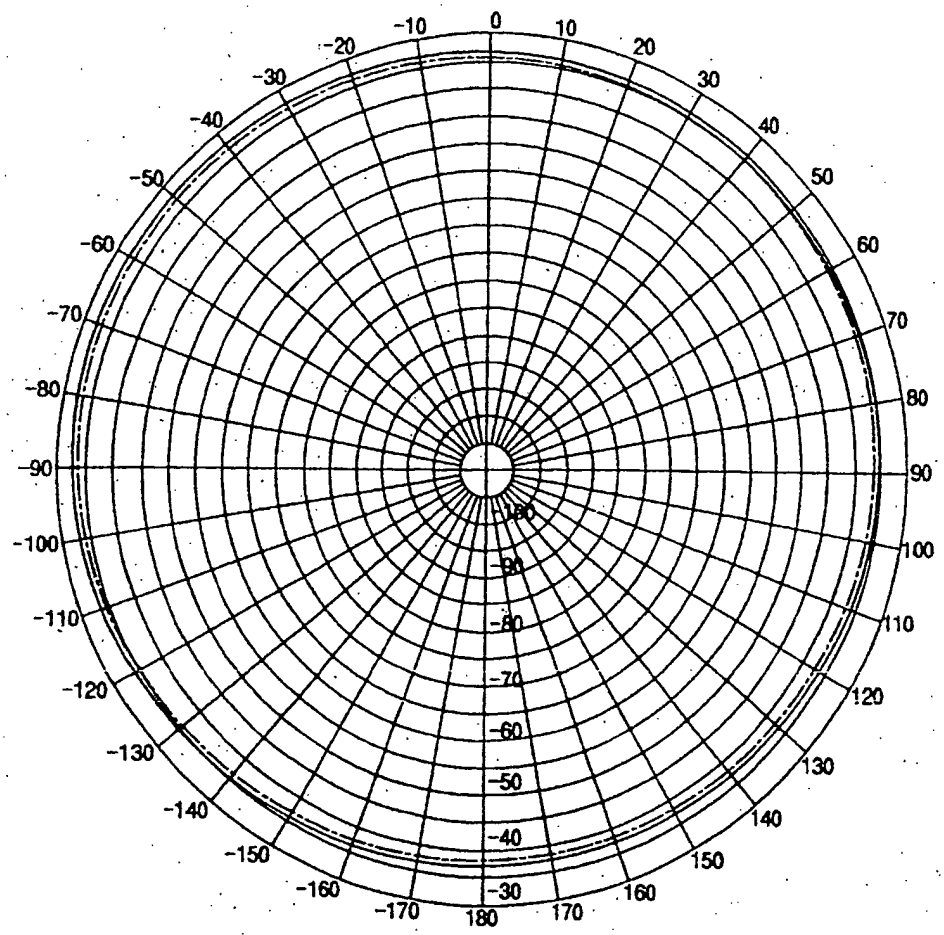
FIG. 10



_____ conventional antenna

- - - - - - the antenna of the present invention

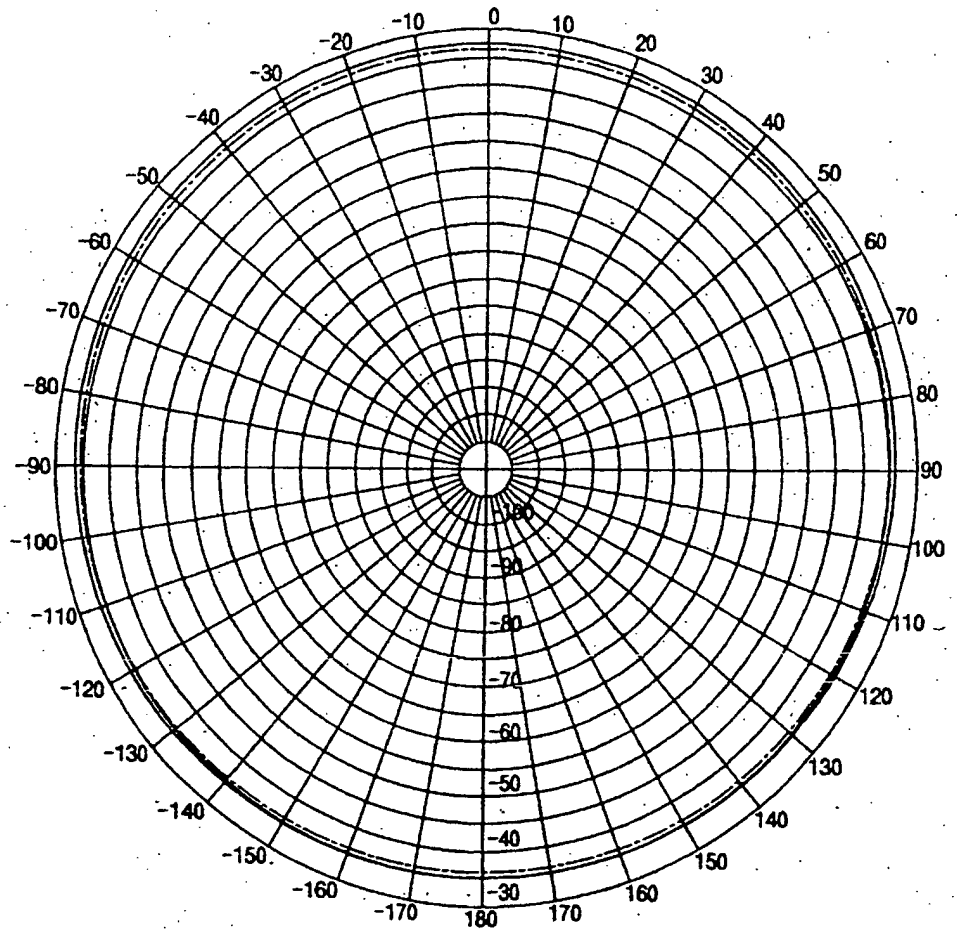
FIG. 11



_____ conventional antenna

- - - - - - the antenna of the present invention

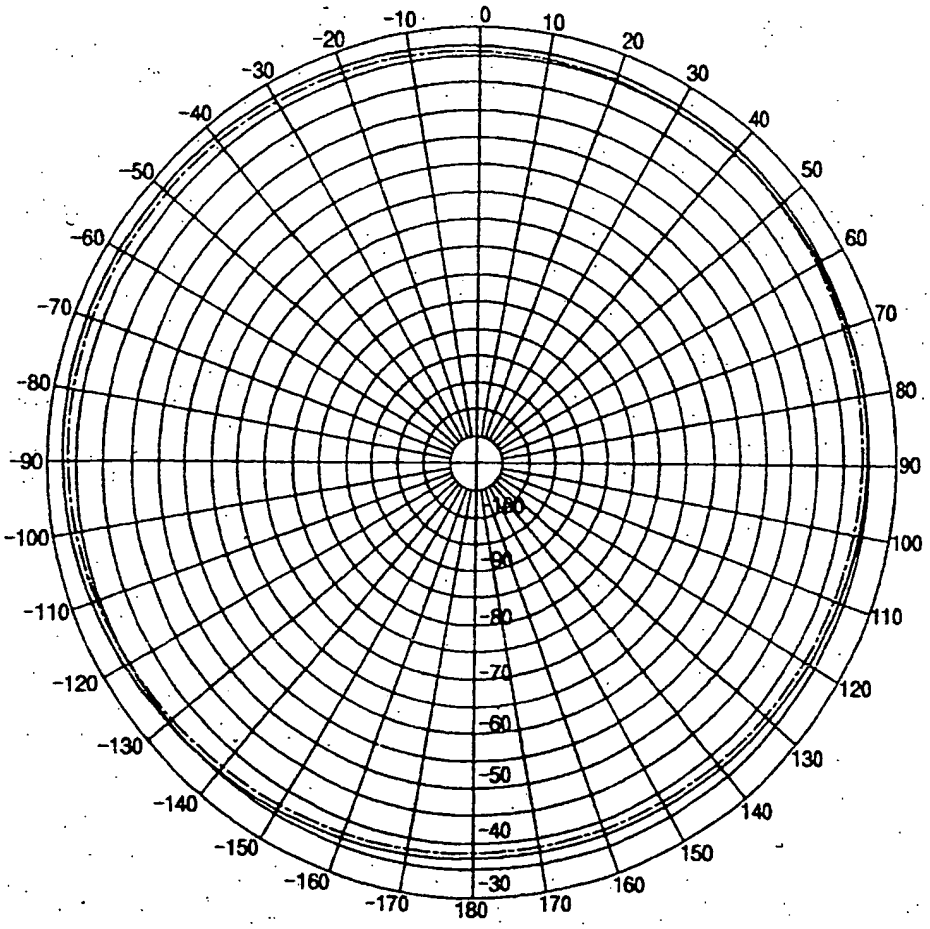
FIG. 12



_____ conventional antenna

- - - - - - the antenna of the present invention

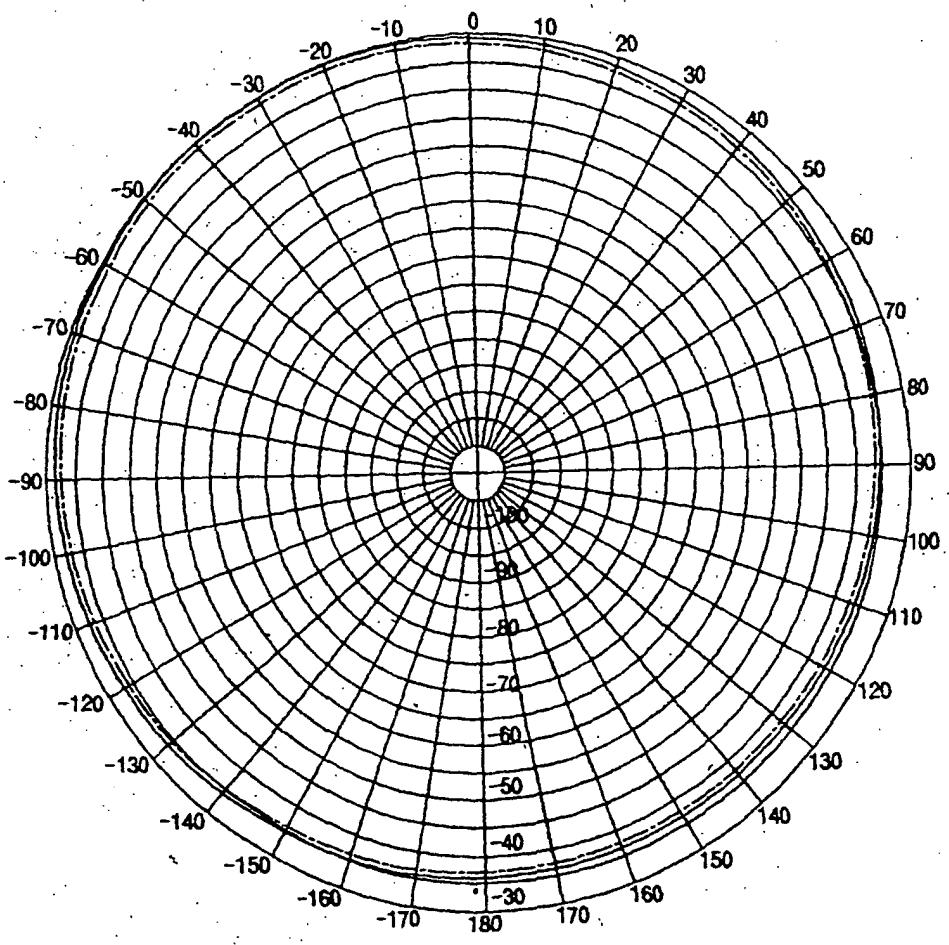
FIG. 13



_____ conventional antenna

- - - - - - the antenna of the present invention

FIG. 14.



———— conventional antenna

- - - - - - the antenna of the present invention

INTERNATIONAL SEARCH REPORT

ational application No.
PCT/KR00/01552

A. CLASSIFICATION OF SUBJECT MATTER

IPC7 H01Q 11/08

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimun documentation searched (classification system followed by classification symbols)

IPC7 H01Q 1/24

Documentation searched other than minimun documentation to the extent that such documents are included in the fileds searched

Korean Patents and Applications for Inventions since 1975
Korean Utility Models and Applications for Utility Models since 1975

Electronic data base consulted during the internationl search (name of data base and, where practicable, search trerms used)

PATROM, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	KR 2000-49303 A (CHANG, eung-soon) Aug. 5, 2000 See the whole document	1, 2
Y	KR 2000-49325 A (CHANG, eung-soon) Aug. 5, 2000 See the whole document	1, 2
Y	US 5717408 A (Centurion International, Inc.) Feb. 10, 1998 See Abstract and Figs. 2-7	1, 2
A	US 5594457 A (Centurion International, Inc.) Jan. 14, 1997 See the whole document	1, 2

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:
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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
23 JUNE 2001 (23.06.2001)	25 JUNE 2001 (25.06.2001)
Name and mailing address of the ISA/KR Korean Intellectual Property Office Government Complex-Daejeon, Dunsan-dong, Seo-gu, Daejeon Metropolitan City 302-701, Republic of Korea Facsimile No. 82-42-472-7140	Authorized officer PARK, Chong Han Telephone No. 82-42-481-5713

Form PCT/ISA/210 (second sheet) (July 1998)

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